NINDS CDE Notice of Copyright
Pendulum (Wartenberg) Test

Availability:	Information about this test is available on the SCIRE project website at Spinal Cord Injury Rehabilitation Evidence Pendulum (Wartenberg) Test Instrument Link
Classification:	**Exploratory**: Spinal Cord Injury (SCI) and SCI-Pediatric
Short Description of Instrument:	**Construct measured:** Spasticity **Generic vs. disease specific**: Generic **Intended respondent:** Participant
Comments/Special instructions:	**Background:** The Pendulum (Wartenburg) Test is an instrumented test of the velocity-dependent hyperreflexia aspect of spasticity.
Rationale/ Justification:	**Strengths/ Weaknesses:** Like many tests of spasticity, the Pendulum Test is limited by the episodic, complex and variable nature of spasticity. It is mainly useful in testing the knee extensors but has also been used for the upper extremity. It has been used in studies of spasticity in SCI, but has been more extensively used for studies involving stroke participants. It has the advantage of providing a quantitative' measure, as compared to the more qualitative Modified Ashworth Score. However, the quantitative output of the test is not readily interpretable in terms of the clinical meaning and the test requires specialized equipment and analysis methods. It is only a truly continuous measure within a certain range of hyperreflexia. It is likely more valuable when combined with electromyographic (EMG) recordings from the involved muscles (see Figure 2 in Hofstoetter, et al., 2014). It is difficult to say whether it provides additional practical value to the Modified Ashworth Score, which is a simpler test that can be applied to a wider range of muscle groups. However, the Pendulum Test was used as a supplemental measure in a registration trial of tizanidine. SCI-Pediatric-specific: No modifications needed for children age 30 months and older.
References:	Hofstoetter, U. S., McKay, W. B., Tansey, K. E., Mayr, W., Kern, H., & Minassian, K. (2014). Modification of spasticity by transcutaneous spinal cord stimulation in individuals with incomplete spinal cord injury. J Spinal Cord Med, 37(2), 202–211. Hsieh, J. T., Wolfe, D. L., Miller, W. C., & Curt, A. (2008). Spasticity outcome measures in spinal cord injury: psychometric properties and clinical utility. Spinal Cord, 46(2), 86–95.